

A case report of umbilical cord torsion with a favorable outcome

Umbilical cord torsion and outcome

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Abstract

Umbilical cord torsion is a rare form of cord accidents, which is an important cause of stillbirth. Due to the fact that it is difficult to diagnose cord torsion prenatally, the majority of cases are associated with intrauterine fetal demise. Here we report a case of pregnancy acutely complicated by umbilical cord torsion with the favorable outcome.

Keywords

Umbilical Cord; Torsion of Cord; Wharton's Jelly; Outcome

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Introduction

Umbilical cord accidents are an important cause of stillbirth and account for over 10% of cases [1]. Cord abnormalities related to morphology, coiling, placental insertion, number of vessels, length, diameter, Wharton's jelly content and blood flow pattern can contribute to perinatal complications [1]. Umbilical cord torsion is a rare form of cord constriction, and is defined as excessive twisting of the cord at any site along the length of the umbilical cord [2]. It can either lead to chronic hypoxia with critically reduced blood flow, oligohydramnios and fetal growth retardation, or severely obstruct fetal-placental circulation with subsequent death [3,4]. Although advances in imaging studies have made it possible to identify an umbilical cord accident, it can be difficult to diagnose cord torsion prenatally [2]. The majority of cases diagnosed with umbilical cord torsion, upon postnatal examination were associated with intrauterine fetal demise [4,5]. Here we report a case of pregnancy acutely complicated by umbilical cord torsion.

Case Report

A 26-year-old woman with gravida 1, para 0 at 33 weeks of gestation was admitted to the hospital after noticing the loss of sensation of fetal movements for at least 24 hours. Until then, she had regular follow-up, and her pregnancy had been progressing without complication. She had no history of trauma, vaginal bleeding, infection, or medication. At the last visit three days ago, ultrasound examinations, including fetal biometry measures and Doppler flow examinations were normal. On examination, her vitals were normal. Examination of the abdomen revealed 33 weeks pregnant uterus and cephalic presentation. There were no any signs of labor. Laboratory tests, including hematological and biochemical ones, were within normal limits. The fetal heart rate monitoring showed a rate of 150 beats per minute with absent variability. Obstetric ultrasound showed a single cephalic fetus of 34 gestational

weeks weighing 2040 grams with the absence of fetal body and respiratory movements. The amniotic fluid index was 14 centimeters. The placenta was situated at the fundus and there was no demonstrable fetal or placental abnormality. The layer of Wharton jelly overlying the umbilical cord near where it enters the anterior wall of the fetal abdomen was thick. Doppler velocimetry on the umbilical artery showed that the pulsatility index value was 0.32 (normal range: 0.86–1.19 at 34 weeks of gestation), and that the peak systolic to end-diastolic (S/D) flow velocity ratio was 1.38 (normal range: 2.52–3.58) at the cord's initial section (Figure 1A). On the rest of umbilical cord, including middle section and the section in the placenta, Doppler flow analysis could not be calculated due to absent systolic blood flow. Due to the presence of the above-mentioned findings, a female neonate weighing 2000 grams was delivered by cesarean section. The delivery was attended by the neonatal resuscitation team, and resuscitation was performed in a standard manner. She was intubated within few minutes for poor respiratory effort. The Apgar scores were 5 and 8 at 1 and 5 minutes of life, respectively. The umbilical cord, with 45 cm of length, was twisted at the fetal insertion site (Figure 1B). Umbilical cord arterial gas values were as follows; pH: 7.16, pCO₂:69 mmHg, pO₂:34 mmHg, HCO₃:18.4 mmol/L, and base excess: -3.4 mmol/L. Following delivery room stabilization, she was admitted to the neonatal intensive care unit, and received routine care with empirical antibiotics, parenteral nutrition, and ventilation support. After three hours she was extubated, and received supplemental oxygen for up to four days. Thereafter, she presented good postnatal evolution and was discharged from the hospital on the 26th day of life. The family was fully informed of the risk of subsequent pregnancies. One year later, she was doing well without any signs of neurodevelopmental disabilities. Informed consent was obtained from the parents to publish this case.



Figure 1. A. Doppler velocimetry on the umbilical artery showing the decreased pulsatility index.

B. The thickened layer of Wharton jelly and the root of umbilical cord where twisted in utero. Note that the region twisted is damaged.

Discussion

Umbilical cord torsion can occur at any time during pregnancy, but is more common during the second and third trimesters [3]. Although it is considered to be a sporadic event, recent reports have shown familial clustering, which suggests a genetic predisposition in some cases [5]. Risk factors such as absence of Wharton jelly, increased fetal mobility, excessively long and hypercoiled umbilical cord, twin gestations and invasive procedures are believed to play a role in the development of umbilical cord torsions [2,5]. Wharton jelly is known to protect the umbilical vessels by providing elasticity and partial rigidity, serving as a supportive layer, so the lack or abnormality of Wharton jelly may cause weakness in the cord and predispose it to torsion and resultant vascular compromise. The site of torsion is usually the area where the umbilical cord enters the fetal abdomen. Edema may be present in the distal portion of the affected area or areas [4]. Torsion may be associated with a pronounced spiraling or intensively twisted umbilical cord [1]. In the case presented here, it seemed that the excessive thickness of Wharton jelly near the fetal insertion site led the thinner cord section just above there to coiling and twisting excessively. The presence of adverse fetal and placental changes related to cord torsion, prior to fetal demise, may raise suspicion and make it possible to identify cord torsion prenatally using ultrasonography. It is suggested that decreasing blood flow through the area of torsion may lead to serious consequences for fetus, and the most reported of them are heart failure, non-immune hydrops, intrauterine growth retardation, placental insufficiency and oligohydramnios [6,7]. If cord torsion develops acutely or the above-mentioned changes are not recognized timely, intrauterine fetal death may be the first clinically apparent manifestation, even in pregnant on regular follow-up [4,7]. As in the case presented here, a decrease in fetal movements may be the only symptom, so prompt recognition followed by an early intervention is essential to prevent complications and spare fetal death. It has been reported that identifying marked spiraling cord by prenatal ultrasound measurements may predict fetuses with risk for cord torsion. A distance between helixes (the vein-to-vein pitch) less than 2 cm, or a pitch value of the cord below 2.0 and a ratio of the systolic maximum blood flow velocity of the umbilical artery to the end-diastolic blood flow velocity (S/D) greater than 3.0 may help predict cord torsion, and it is recommended that these fetuses should be closely monitored to identify relevant complications [7,8]. In the case presented, the distance between helixes reduced in the initial section of the umbilical cord, where the torsion happened, but not in the rest of the sections. Additionally, the cord blood flow S/D ratio could not be measured due to the absence of typical flow velocities. Since cord torsion in this case was formed by a different mechanism, it was difficult to predict using the previously reported methods. It developed acutely and diminished cord blood flow that was severe enough to cause fetal distress. Fortunately, a favorable outcome was achieved by prompt intervention.

In conclusion, this case report showed that umbilical cord torsion can occur unexpectedly despite the regular antenatal visits and having no risk factors, emphasizing the importance of umbilical cord imaging as part of the fetal evaluation.

However, optimal measurements, which may predict the risk of fetal cord torsion are not available, and require prospective comprehensive researches.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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